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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,866	10/23/2003	Paul A. Ward	082778-0235 CSDL-0639CN	6735
48329 7590 01/09/2009 FOLEY & LARDNER LLP 111 HUNTINGTON AVENUE 26TH FLOOR BOSTON, MA 02199-7610				
EXAMINER				
CORRIELUS, JEAN B				
ART UNIT		PAPER NUMBER		
2611				
MAIL DATE		DELIVERY MODE		
01/09/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/691,866

**Applicant(s)**

WARD ET AL.

**Examiner**

Jean B. Corrielus

**Art Unit**

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11/26/08.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 24-26, 36, 41 and 42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24-26, 36, 41, and 42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S5108)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 24-26, 36 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kendig et al US Patent No. 4,955,269 in view of applicant's admitted prior art page 12, lines 9-17.

As per claim 24, Kendig teaches a method and apparatus Fig. 2 comprising a vibration sensor 23 which produces a sinusoidal signal see for instance fig. 6 in response to measurement of a parameter (i.e. vibration); an analog to digital converter 26 which receives said analog signal and converts the analog signal to a digital signal to form a digitized signal  $v(t)$  considered as the claimed "inphase digital signal" a Hilbert transformer approximation device see circuit 28/44 and col. 5, lines 1-3 which receives said digital signal output of digitizer 26 and produces signal " $H(v(t))$ " (quadrature component of said digital signal) (note that it is an inherent nature of the transformer to introduce a phase shift to said digital signal) an amplitude computation device 28 (note the device 28 inherently includes an amplitude computation device in order to determine the amplitude of the sinusoidal signal) which receives said "digitized signal  $v(t)$ " (inphase component and " $H(v(t))$ " (quadrature component of said digital signal)" and computes the instantaneous amplitude of said digital signal according to  $a = \text{SQRT}(v(t)^2$

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+  $H(v(t))^2$  see col. 5, equation 4. Kendig et al further teaches the additional component of a phase computation device inherently included in device 28 which receives said "digitized signal  $v(t)$ " (inphase component and " $H(v(t))$ " (quadrature component of said digital signal)" and computes the instantaneous amplitude of said digital signal and computes the instantaneous phase of said digital signal according to  $\theta = \text{ARCTAN}(H(v(t)/v(t)))^1$  note col. 5, equation 6. However, Kendig fails to a CORDIC processor is used to compute the phase and amplitude signal. However, at page 12, lines 9-17, applicant acknowledges that a CORDIC processor is a well known device used in signal processing for fast digital trigonometric computations. Given that it would have been obvious to one skill in the art to incorporate such a teaching in Kendig in order to perform fast digital trigonometric computations.

As per claim 25, note that the delay in Kendig is inherent because, as established in the art of digital signal processing, it is an inherent nature of the Hilbert transformer to introduce a predetermined delay into said " $H(v(t))$ " (quadrature) component of the digitized signal.

As per claim 26, note that because of the inherent delay introduced by the Hilbert transformer, Kendig has to include a delay device to introduce said predetermined delay into the digitized signal i.e. (Inphase component) so that the digitized signal and the Hilbert transformed signal can be provided to the phase and amplitude computing device at the same time to determine the phase and the amplitude of the sinusoidal signal.

As per claim 41, see claim 24. In addition, note that the analog signal generated by Kendig includes both a phase and an amplitude of said parameter(vibration) see fig. 6.

3. Claims 36 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kendig et al US Patent No. 4,955,269 in view of applicant's admitted prior art page 12, lines 9-17 and further in view of Kotoulas US Patent No. 6,751,602.

As per claim 36, Kendig teaches a method and apparatus Fig. 2 comprising a vibration sensor 23 which produces a sinusoidal signal see for instance fig. 6 in response to measurement of a parameter (i.e. vibration); an analog to digital converter 26 which receives said analog signal and converts the analog signal to a digital signal to form a digitized signal  $v(t)$  considered as the claimed "inphase digital signal" a Hilbert transformer approximation device see circuit 28/44 and col. 5, lines 1-3 which receives said digital signal output of digitizer 26 and produces signal " $H(v(t))$ " (quadrature component of said digital signal) (note that it is an inherent nature of the transformer to introduce a phase shift to said digital signal) an amplitude computation device 28 ( note the device 28 inherently includes an amplitude computation device in order to determine the amplitude of the sinusoidal signal) which receives said "digitized signal  $v(t)$ " (inphase component and " $H(v(t))$ " (quadrature component of said digital signal)" and computes the instantaneous amplitude of said digital signal according to  $a = \sqrt{v(t)^2 + H(v(t))^2}$  see col. 5, equation 4. Kendig et al further teaches the additional component of a phase computation device inherently included in device 28 which receives said "digitized signal  $v(t)$ " (inphase component and " $H(v(t))$ " (quadrature component of said

digital signal)" and computes the instantaneous amplitude of said digital signal and computes the instantaneous phase of said digital signal according to  $\theta = \text{ARCTAN} (H(v(t)/v(t)))^{-1}$  note col. 5, equation 6. Note that because of the inherent delay introduced by the Hilbert transformer, Kendig has to include a delay device to introduce said predetermined delay into the digitized signal i.e. ( Inphase component) so that the digitized signal and the Hilbert transformed signal can be provided to the phase and amplitude computing device at the same time to determine the phase and the amplitude of the sinusoidal signal. However, Kendig fails to a CORDIC processor is used to compute the phase and amplitude signal it also fails to teach the filtering of the digitized signal to attenuate out of band noise in said digital sinusoidal signal. However, at page 12, lines 9-17, applicant acknowledges that a CORDIC processor is a well known device used in signal processing for fast digital trigonometric computations. Given that it would have been obvious to one skill in the art to incorporate such a teaching in Kendig in order to perform fast digital trigonometric computations. In addition, Kotoulas teaches a filter 232 to attenuate out of band noise in said digital signal. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Kendig and applicant's admitted prior art in order to improve signal detection since the noise reduced signal would have produced a better signal.

As per claim 42, see claim 36. In addition, note that the analog signal generated by Kendig includes both a phase and an amplitude of said parameter(vibration) see fig. 6.

***Response to Arguments***

4. Applicant's arguments with respect to claims 24-26, 36 and 41-42 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Monday-Thursday from 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jean B Corrielus/  
Primary Examiner  
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